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ABSTRACT

This paper details a study into the development of a WebCT based learning resource, which was used to augment the delivery of a second year degree level module. The development of the learning resource was informed by the educational theories expounded in the conversational framework, Laurillard (1993). Subsequently, the resource was evaluated using criteria extracted from the conversational framework as a set of guidelines. It was found that all of the criteria could be supported to some extent, although in some areas the support was marginal. The learning resource was then evaluated by students who were asked to give details about which of the individual facilities were used, and beyond this, which were useful. The results of this student centered evaluation showed that the students did not consider several key facilities "useful." It is suggested that further work be done on developing a method for determining criteria, implementing a resource and evaluating the facilities for successfulness, as determined by students. (Author)

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An Educational Evaluation of WebCT; a Case Study using the Conversational Framework

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Abstract: This paper details a study into the development of a WebCT based learning resource, which was used to augment the delivery of a second year degree level module. The development of the learning resource was informed by the educational theories expounded in the conversational framework, Laurillard (1993). Subsequently the resource was evaluated using criteria extracted from the conversational framework as a set of guidelines. It was found that all of the criteria could be supported to some extent, although in some areas the support was marginal. The learning resource was then evaluated by students who were asked to give details about which of the individual facilities were used, and beyond this which were useful. The results of this student centered evaluation showed that the students did not consider several key facilities 'useful'. It is suggested that further work be done on developing a method for determining criteria, implementing a resource and evaluating the facilities for successfulness, as determined by students.

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Introduction

The process of defining educational criteria with which to inform the development of a computer based learning resource is well known. There are a wide range of criteria, informed for the most part by the theoretical assertions of a variety of pedagogic traditions and paradigms. Most of us involved in developing computer based learning resources will be familiar to some extent with one or more of these traditions. The process of choosing criteria, developing the resource and analysing the extent to which the attributes in the learning resource support the criteria is also well known. In addition to this, many of us are familiar with evaluative measures that seek to shed light on the successfulness of the resultant learning resource in general terms. Often these take the form of questionnaires seeking to elicit student attitudes to the learning resource as a whole. Thus we have on the one hand pedagogic objectives, and on the other hand student evaluation as to the success overall of the learning resource. However these two elements are not necessarily directly connected. It is possible to have met a set of criteria in creating a successfully learning resource, without those criteria having had significant bearing upon the outcome.

This paper is based upon a case study learning resource, constructed using WebCT.
The design of the learning resources was informed making use of criteria taken from the conversational Framework devised by Laurillard (1993). The case study is described in the next section, followed by an explanation of the criteria taken from the conversational framework.

The case study

The case study module under consideration is IC240 module, 'IT in business', a second year module provided by the division of Information and Communication Technologies, which is part of the University of Abertay Dundee. The students of IC240 are studying for degrees in accountancy, tourism, business, management and a range of other courses. This diverse mixture of student backgrounds means that there is a wide range in levels of previous experience in IT. In practical terms this diversity of student experience suggests that a flexible learning resource would be beneficial to students. For this reason a learning resource making use of the Virtual Learning Environment (VLE) WebCT was developed.

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WebCT is an integrated web based learning environment. It was devised at the university of British Columbia, www.webct.com. The software is based upon web technology, offering a number of facilities running as Java scripts or applets. In this study the vast majority of WebCT facilities available were deployed, Table 1 outlines the facilities and how they were used.

Table 1 WebCT facilities/use

Navigation model	**Discussion Forum**	**Compile**
Home page with	Course questions	Sections of module material
icons/hyperlinks to resources.	**My progress**	**Calendar**
Content	Charting access	Module information and
Module Material	**Chat**	deadlines
Quiz	Questions to tutor and other	**References**
Formative and summative	students participation	Links to external resources
assessments	**Whiteboard**	**Student Web Pages &**
Survey	Student interaction **Student**	**presentations**
Evaluative feedback	**tracking**	Student created content
Goals	Register	**Glossary**
Learning objectives		Defined terms

The case study learning resource was the subject of a two-fold evaluation. Firstly the learning resource was evaluated heuristically against the criteria extracted from the conversational framework. Subsequently the individual facilities comprising the learning resource were tested by means of a survey of student opinion.

The Conversational Framework

The heuristic evaluation made use of the Conversational Framework developed by Laurillard (1993) as an evaluation tool for WebCT. This framework was chosen as the work encapsulated in the framework has pioneered the evaluation of hypermedia based learning resources. Authors such as Brittain (1999) have argued that whether the VLE is being used for distance learning or to enhance learning within institutions, their most important role is as a medium for supporting constructivist and conversational approaches to learning (Brittain 1999). Therefore Laurillard's conversational model offers itself as an interesting candidate for providing the basis of a heuristic pedagogical evaluation framework for WebCT.

The roots of the framework lie in the Conversation Theory developed by Gordon Pask (1976), although Laurillard traces the need for dialogue in the learning process back to the Socratic method of philosophical enquiry. The centrality of dialogue in the model comes from the need for the teacher to unearth the student's mental constructs about a topic before negotiating the path to the target conception that is the goal of learning from the teacher's perspective.

The teaching strategy advocated in the model is based on interaction between lecturer and student and not solely on the actions required of the student. The model advocates that action on the part of the student is constructed around the dialogue and should be supplemented by constructive and meaningful feedback from the teacher. There are a number of key characteristics of the conversational model as applied to academic learning. These are drawn from Laurillard, (1993, pp.94-95).

1. T(eacher) can describe conception
2. S(tudent) can describe conception
3. T can redescribe in the light of S's conception or action
4. S can redescribe in light of T's redescription or action
5. T can adapt task goal in light of S's description or action
6. T can set task goal
7. S can act to achieve task goal
8. T can set up world to give intrinsic feedback on actions
9. S can modify in light of feedback on action
10. S can adapt actions in light of T's description
11. S can reflect on interaction to modify redescription
12. T can reflect on S's action to modify redescription

It is important to note that these criteria are not necessarily sequential, but it is suggested that they should be supported by WebCT if it is to be judged compliant with this educational model. In the next section we will explore the extent to which the case study module is successful in delivering the criteria, but before this we will examine an important new revision of the conversational framework.

Conversational Framework revision 1999

The first version of the conversational framework (Laurillard, 1993) described the learning process and was used as an analytic tool for information technology media and methods. However, the original framework did not indicate a process whereby the student internalised their learning, rather it focuses entirely upon a dialogue between student and teacher. This omission has been dealt with in an article 'A conversational framework for individual learning applied to the 'learning organisation' and the learning society.' (Laurillard, 1999). Clearly this revision addresses a crucial part of learning, and as such it is suggested that the evaluative criteria be expanded to encompass this element. Therefore for the purposes of this evaluation the full set of criteria will be numbers 1-12 as indicated above and in addition;

13. S can internalise articulation/action.

The Heuristic Evaluation

A suitable evaluation framework for WebCT using the conversational model could be constructed in a variety of ways. The way suggested in this study involved constructing a table that describes the tools that are available for each of the stages of interaction described in the model (see Table 2). Table 2 shows the evaluation framework for WebCT using the interactions in the conversational model as criteria against which to identify the tools provided by WebCT. For each element a WebCT tool is identified along with a description of how it was used in the case study module.

This relatively simple approach offers much potential as a methodology for evaluating virtual learning environments (VLE) such as WebCT. A similar proposal has been recently put forward by Crawley, (1999). However, the major emphasis in this study is the way the evaluation by students, given in the next section, is used to validate the findings put forward by the theoretical evaluation.

In order to evaluate WebCT using the conversational framework we need to establish which tools are provided within the software to allow dialogue and action to mutually influence each other to allow modification of both conceptions and actions on the part of the student as described above. Another issue that quickly becomes apparent is that the notion of a 'micro-world', takes on a different meaning in the case of WebCT than more traditional forms of courseware, Britain (1999). In essence, WebCT provides the tools for a lecturer to build a micro-world by allowing the teacher to construct learning activities enriched by the resources.

Table 2 Conversational framework evaluation of WebCT

CHARACTERISTIC	SUPPORTED	IC240 example
1. T can describe conception	Goals, Module content. Ref., Calendar	Database exercise, Theoretical content.
2. S can describe conception	Discussion forum, Chat, Whiteboard, Web pages	Questions, Remote lab
3. T can redescribe in the light of S's conception or action	Discussion forum, Chat, Whiteboard.	Answers, Remote lab
4. S can redescribe in light of T's redescription or action	Discussion forum, Chat, Whiteboard Web pages	Questions, Remote lab
5. T can adapt task goal in light of S's description or action.	Goals, Module content, References.	Discussion
6. T can set task goal	Goals, Module content.	Learning objectives Database exercises, quiz information.
7. S can act to achieve task goal	Quiz, Compile	Build notes

		Review test, Examination.
8. T can set up world to give intrinsic feedback on actions	Quiz, Progress	Review test.
9. S can modify in light of feedback on action	Quiz	Review test.
10. S can adapt actions in light of T's description	Quiz	Review test.
11. S can reflect on interaction to modify redescription	Discussion forum, Chat, Whiteboard.	Discussions
12. T can reflect on S's action to modify redescription.	Discussion forum,Chat, Whiteboard.	Discussions
13. S can internalise articulation/action.	Note editor.	Independent study.

The points described in the table show that WebCT as used for the module in this study has, at least to some extent, the facilities to support all of the features laid out by the conversational model. However it is important to consider how successful the learning resource is at delivering the requirements specified in the conversational framework. It is the results of this evaluation, given in the next section, that will be used to make a judgement as to whether this particular resource is *successfully* compliant with the criteria in this educational evaluation.

Student centered evaluation

In this study the evaluative measures included an 'exit survey'. The rationale for the exit survey was to find out directly what the experience of using WebCT was like for the students. The students were asked about their experience in general, where it was discovered that 13 of the 15 students taking part in the evaluation, found the resource as a whole useful, 2 were neutral, none negative. It is important to note that only fifteen students were involved in the survey, representing around a quarter of the total number of student studying the module. These numbers mean that the findings can only be regarded as indicative, carried out within the context of a pilot study. The next two questions in the survey sought to shed light into which facilities the students used, and beyond this which they found useful. This distinction between used and useful is crucial for this study. It is suggested that it is not sufficient to say that a theory indicates the use of a facility, and consequently its inclusion validates the learning resource. If students do not find the facilities useful it throws into doubt the voracity of using the facility to achieve a particular educational objective. The questions and findings where as follows:

- From the list of WebCT facilities which have you USED?
- From the list of WebCT facilities which did you find USEFUL?

Table 3 The results of the student evaluation 'exit survey'

Response	Number of response (used)	Number of responses (useful)	Percentage of total Useful
1. Module content	15	15	100%
2. Discussion Forum	9	7	46%
3. Chat	9	5	33%
4. Calendar	15	12	80%
5. Quiz Review tests	15	15	100%
6. Whiteboard	7	1	7%
7.Check up progress	4	0	0%
8. Compile notes	9	6	40%
9.Targets/goals	4	3	26%
10. References	8	8	53%
11. Web page authoring	9	6	40%
12. Note editor	4	1	7%

These results indicate that some facilities were used but not found to be useful, in particular the note editor, discussion forum, chat, whiteboard, check progress and targets were not useful to all of the students who used them. In addition, some of the students elected to not use some of the facilities. As some of these facilities were key to supporting the conversational framework, this finding poses searching questions about the context for their use. Further analyses of the findings regarding the usefulness of the facilities are shown in table 4 on the next page. Table 4 shows the numbered items from the educational criteria along the top (listed in table 5), whilst the WebCT facilities are listed down the left hand side. This form of analysis i.e. the conversational framework analysed against the facilities in a VLE was used by Conole (1998). It is suggested however, that this analysis goes a step further, in so far as it makes use of student evaluation to inform the rate of successfulness. The table highlights the points discussed earlier, for example some of the requirements are not being *successfully* met.

Table 4, on the next page, shows that as the module content display was useful to 100% of students, therefore criteria 1, 5 and 6 of the conversational framework were successfully implemented. On the other hand, the note editor facility was useful to only 7% of students, therefore criteria 13 can not be said to be successfully implemented. Reading the table starting from the criteria, we can see criteria 6 Teacher set task goal, is successfully implemented by the module content facility if not entirely by the goal setting facility. Perhaps most significantly for the conversational framework the facilities being used to support interaction between Student and Teacher, for example criteria 2,3 and 4, are not being entirely successfully implemented by facilities such as the discussion forum.

Table 5 Conversational framework Criteria

1. T(eacher) can describe conception
2. S(tudent) can describe conception
3. T can re-describe in the light of S's conception or action
4. S can re-describe in light of T's re-description or action
5. T can adapt task goal in light of S's description or action.
6. T can set task goal
7. S can act to achieve task goal
8. T can set up world to give intrinsic feedback on actions
9. S can modify in light of feedback on action
10. S can adapt actions in light of T's description
11. S can reflect on interaction to modify re-description
12. T can reflect on S's action to modify re-description
13. S can internalize articulation/action

Conclusion

In conclusion it is suggested that whilst the WebCT software supports the design and development of a learning resource that can be compliant with an educational evaluation based upon the conversational framework. It can not, however, be taken for granted that any individual learning resource is entirely successful in delivering the aims of the conversational framework. The results of this study indicates that success maybe illusive, even in terms of the fundamental requirements. In respect of the IC240 module, it is suggested that the learning resource be redeveloped, in order to leverage more successfully key facilities in the learning resources. In more general terms, it is suggested that the process of developing pedagogically informed learning resources, going from criteria, to facilities and then to evaluation, should be refined into a methodology that focuses upon the student as the main arbiter of successfulness.

Table 4 Successfulness! Conversational framework criteria vs student evaluation.

WebCT Facility	1	2	3	4	5	6	7	8	9	10	11	12	13
Module content	100%				100%	100%							
Calendar	80%												
References i.e. URLs	53%				53%								
Goals/targets	20%				20%	20%							
Discussion group		46%	46%	46%							46%	46%	
Chat		33%	33%	33%							33%	33%	
Whiteboard		7%	7%	7%							7%	7%	
Compile notes							40%						
Quiz Review test								100%	100%	100%			
Progress chart								0%					
Web page authoring		40%		40%									
Note editor													7%

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